THE ALBA SYNCHROTRON LIGHT SOURCE

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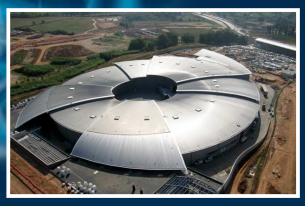
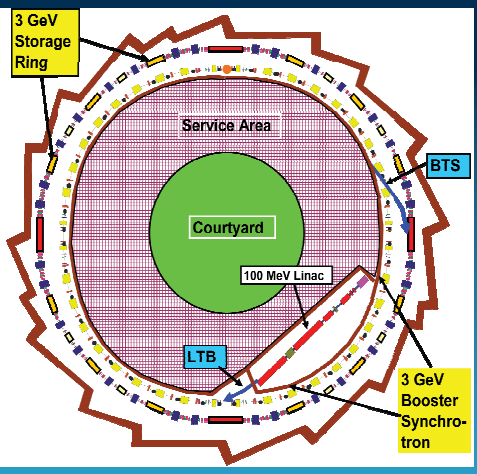


Introduction

ALBA is a 3rd generation Synchrotron Light Source that is located in Cerdanyola, near Barcelona, Spain. To produce the synchrotron light, three accelerators are needed: a LINAC, to extract the electrons from a cathode and accelerate then to en energy of 100 MeV. At this energy, the electrons are injected into a Booster, which increase the energy of the electrons up to 3 GeV, at this energy the electrons are transferred to the Storage Ring, where the Synchrotron Ligth is produced. The Storage Ring has been designed for a maximum current of 400 mA. Since May 2012 ALBA is open to users. At this moment the seven beamlines of phase I are working 24 hours per day, seven days per week. Beam current has been continously increased and we reached 200 mA in multi-bunch filling pattern.

	Linac	Booster	Storage ring
Energy [GeV]	0.1	0.1-3	3
Circunference (m)		249	268
Bunch spacing (ns)	2-218	2	2
Rms bunch length (ps)	200	60	15
Hor. Emittance (nm.rad)	150	9	4.3
Horizontal tune Qx	150	9	4.3
Vertical tune Qy		11.42	18.18
Dipole field (T.m)		7.38	8.37



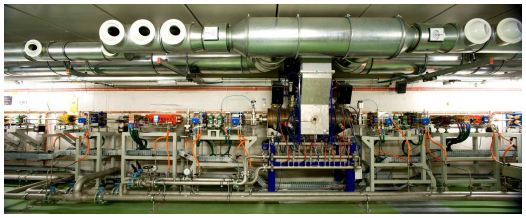
Linac

Electrons are extracted from a cathode.

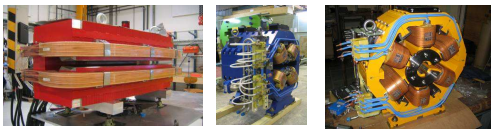
e-

They are accelerated from 0.1MeV to 100 MeV.

0.1-3 GeV Booster



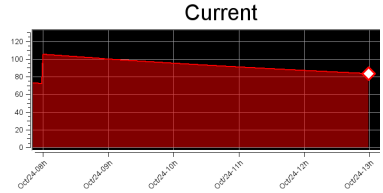
The Booster increases the energy of the electrons from 100 MeV to 3 GeV. The RF cavity (Petra) gives the energy to the electrons.



Magnets are used to maintain the electrons in the orbit.

3 GeV Storage ring

The RF cavity (Dampy) is used to maintain the energy.



DCCT is a non-destructive current transformer to measure the electron beam intensity.

Insertion devices, Beamlines and Front ends

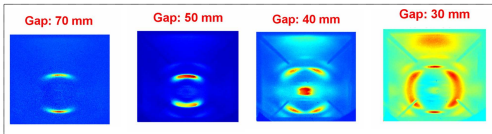


Image of EU71 circular polarized light captured at BOREAS.

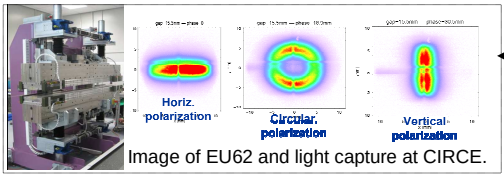
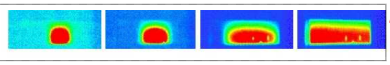
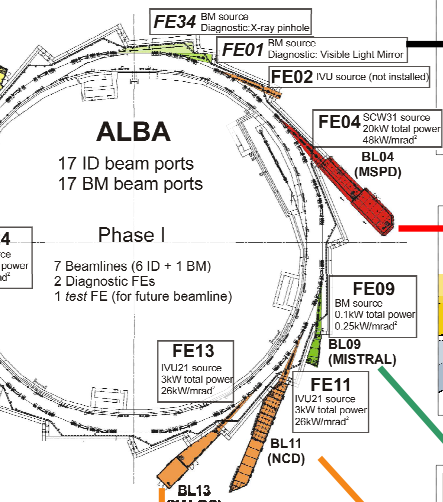


Image of EU62 and light capture at CIRCE.

Emitted light at CLAESS.



8 Front Ends (FE) are devoted to transmit the photons generated by both Insertion Device or Bending Magnet sources to experimental Beamlines, and 2 additional FE for electron beam-diagnostics purposes.



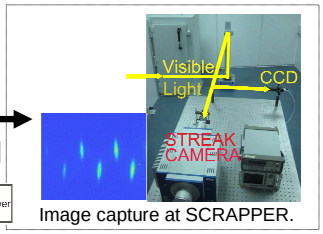
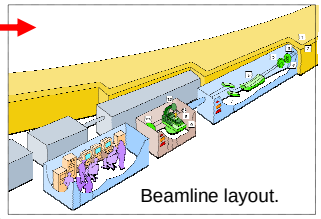
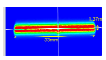


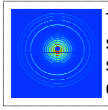
Image capture at SCRAPPER.



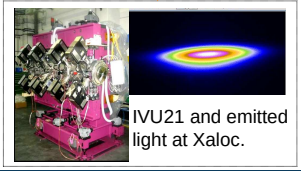
Beamline layout.



Emitted light capture at MISTRAL.



Two-dimensional x-ray scattering pattern of silver collected at NCD during 1s exposure.



IVU21 and emitted light at Xaloc.